Internal Correspondence

Date **February 3, 1999**

From **Tim Wellumson** Location **Monticello SAB**

To **Distribution** Location **Various**

Subject **Monticello Nuclear Generating Plant Key PRA Results - 2/3/99**

The purpose of this letter is to distribute an updated version of the one page Key PRA Results Summary Chart which was previously issued in early 1996. A brief explanation of the information presented on this chart is included below. The chart is meant to be a very general overview of the PRA results. It is based on the latest update of the internal events, at power PRA and includes changes which came about as a result of the rerate of 1998. Please use the chart freely to develop big picture insights into plant operation at power. I request that you contact the PRA group for any detailed application of the PRA because we are not able to convey the many assumptions that went into the complex analysis on a single page. Also note that the information does not apply to shutdown conditions.

Upper Right Chart

The pie chart in the upper right portion of the page depicts the types of core damage events and how much they contribute to the total core damage frequency (CDF). This means that approximately one third of the CDF is due to internal flooding events and nearly a third is due to Station Blackout (SBO) events. Internal floods represent both component failures and errors involving isolation for maintenance. The overall estimated core damage frequency due to internal events for at power conditions is 1.52E-5/yr or about once in every 66,000 years of power operation.

Upper Left and Lower Left Charts

The two charts on the left side of the page are best described together. They illustrate a key point in the use of the PRA. Before you can answer what is the most important system or component, you need to know how the information is going to be used. The upper chart (Fussell-Vesely or FV) shows each systems current contribution to core damage frequency. For example, the Monticello estimated CDF would decrease by about 25% if the EDGs never failed. The lower chart (RAW) shows each systems potential effect on core damage frequency if the system was to significantly degrade in reliability (always fail when needed). Conceptually, the number given is about the number of times CDF would increase if the system always failed when needed.

The following should be considered when using the charts:

1. Each component included in the detailed PRA results was used once and only once when calculating system importance measures. This means that

a SW component that could fail multiple systems, including FW, would be included in the SW system importance calculation and not in the FW system importance calculation.

2. There is no industry standard yet on how to calculate system level importance measures from component level importance measures. The current analytical techniques we use are approximations and the RAW values are slightly overstated. Therefore, one should be careful when using the numerical values off these charts, but realize that the relative rankings are probably quite accurate.

3. The importance measures are useful when looking at one system at a time. When multiple systems are being considered, specialized computer programs must be utilized to take into account synergy between systems.

Bottom Right

The two lists shown here contain the most important operator actions. The first list, Fussell-Vesely, gives the operator actions that would have the most significant effect on lowering core damage frequency if the success rate of the action was improved. The second list, RAW, gives the operator actions that would have the greatest effect toward increasing CDF if the operator were to become less reliable at performing the action. The biggest insight here is that the operator action to depressurize the vessel is at the top of both lists.

I hope this note helps in your understanding of the chart. If you have any questions on PRA, please contact Craig Nierode (1363), or Tim Wellumson (1443).

Sincerely

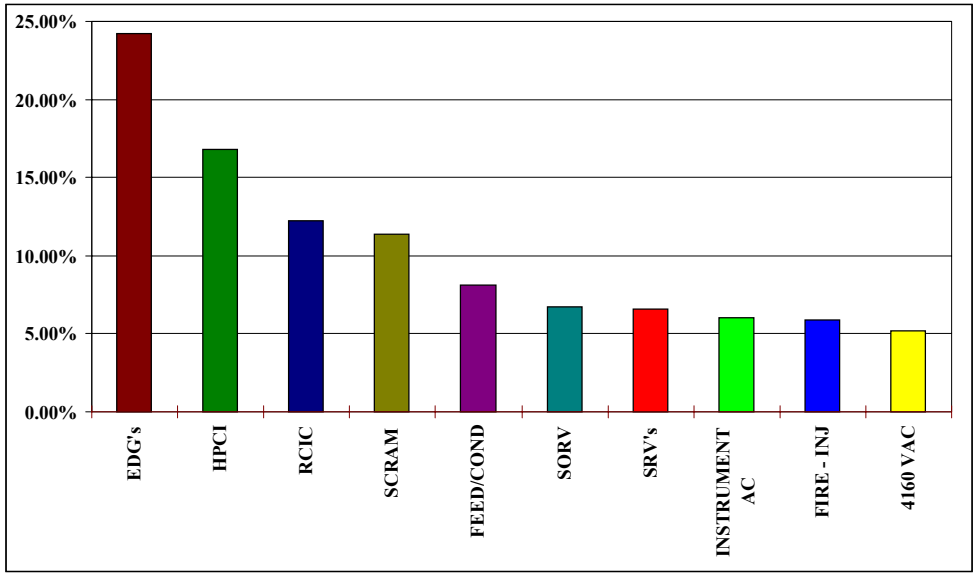
Tim Wellumson
PRA Group
Nuclear Energy Engineering Dept.

attachments: 1

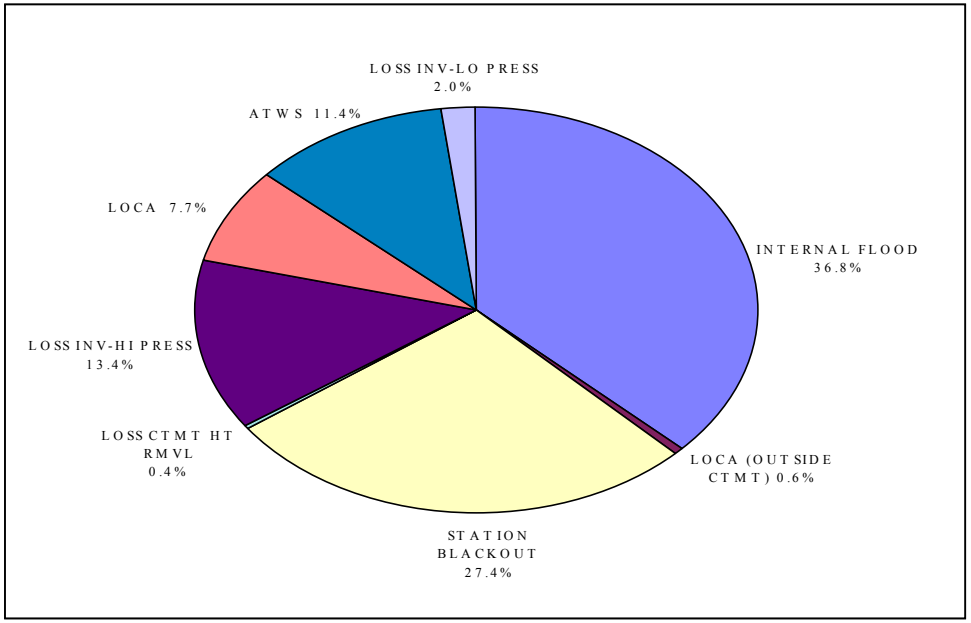
MONTICELLO NUCLEAR GENERATING PLANT

KEY PRA RESULTS:

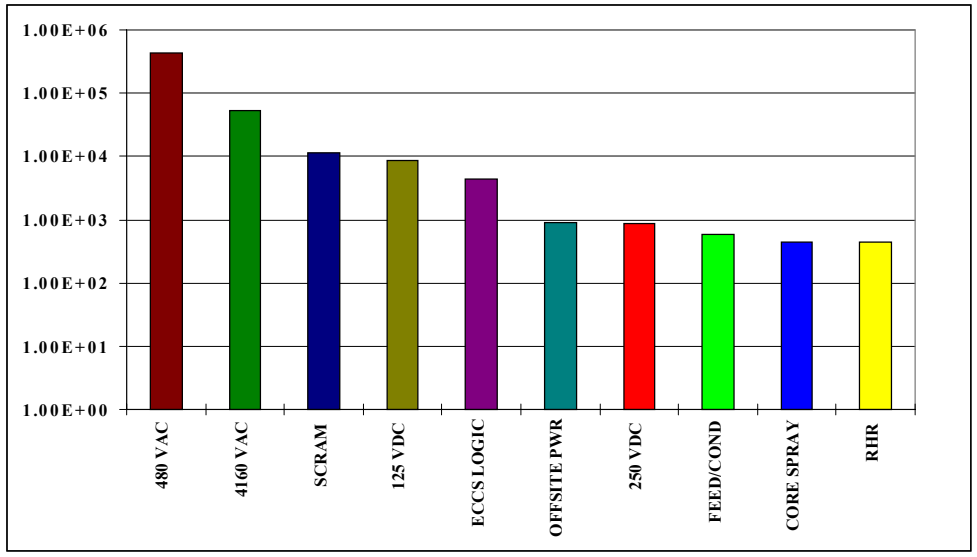
01/29/99



FUSSELL - VESELY IMPORTANCE MEASURE
(Percent Decrease in Core Damage Frequency if System Never Fails)



MNGP PRA ACCIDENT CLASS DISTRIBUTION
(CORE DAMAGE FREQUENCY = 1.52E-5/YR)



RISK ACHIEVEMENT WORTH (RAW) IMPORTANCE MEASURE
(Factor Increase in Core Damage Frequency if System Fails)

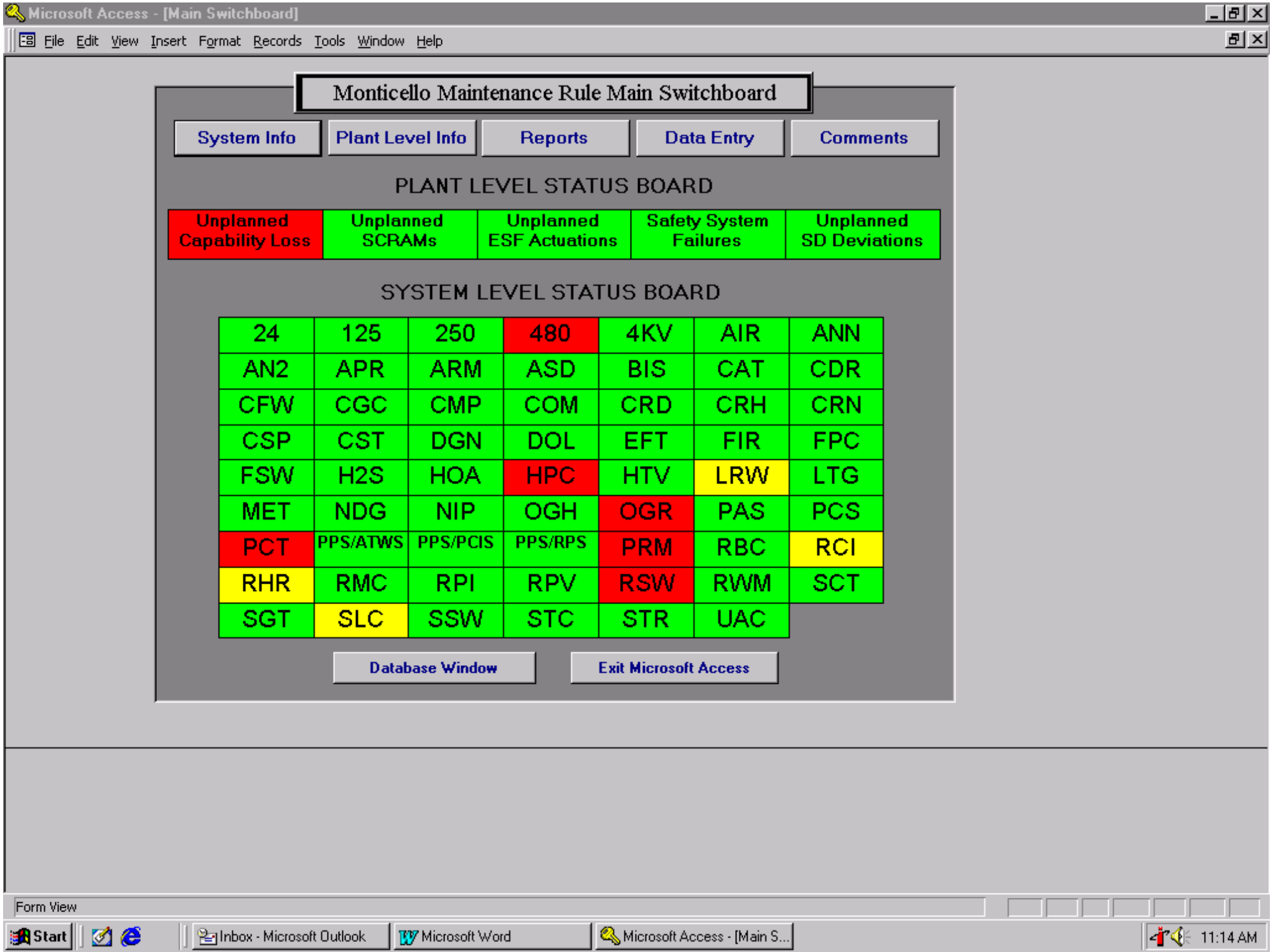
MNGP KEY OPERATOR ACTIONS:

By Fussell - Vesely:

- Reactor Depressurization
- Recover Off-Site Power within 30 Minutes
- Recover Off-Site Power within 6 Hours
- SBO - Recover an EDG within 6 Hours
- Align #13 DG to power Essential MCC's

By Risk Achievement Worth (RAW):

- Reactor Depressurization
- Vent Containment
- Control Feedwater following a Scram
- Control Rx Water Level during an ATWS
- Inject SBLC during an ATWS


Microsoft Access - [Main Switchboard]
File Edit View Insert Format Records Tools Window Help
Monticello Maintenance Rule Main Switchboard
System Info
Plant Level Info
Reports
Data Entry
Comments
PLANT LEVEL STATUS BOARD
Unplanned Capability Loss
Unplanned SCRAMs
Unplanned ESF Actuations
Safety System Failures
Unplanned SD Deviations
SYSTEM LEVEL STATUS BOARD
24 125 250 480 4KV AIR ANN
AN2 APR ARM ASD BIS CAT CDR
CFW CGC CMP COM CRD CRH CRN
CSP CST DGN DOL EFT FIR FPC
FSW H2S HOA HPC HTV LRW LTG
MET NDG NIP OGH OGR PAS PCS
PCT PPS/ATWS PPS/PCIS PPS/RPS PRM RBC RCI
RHR RMC RPI RPV RSW RWM SCT
SGT SLC SSW STC STR UAC
Database Window
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Form View
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Inbox - Microsoft Outlook
Microsoft Word
Microsoft Access - [Main S...
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